

High Sensitivity Indium Phosphide Based Avalanche Photodiode Focal Plane Arrays, Phase I

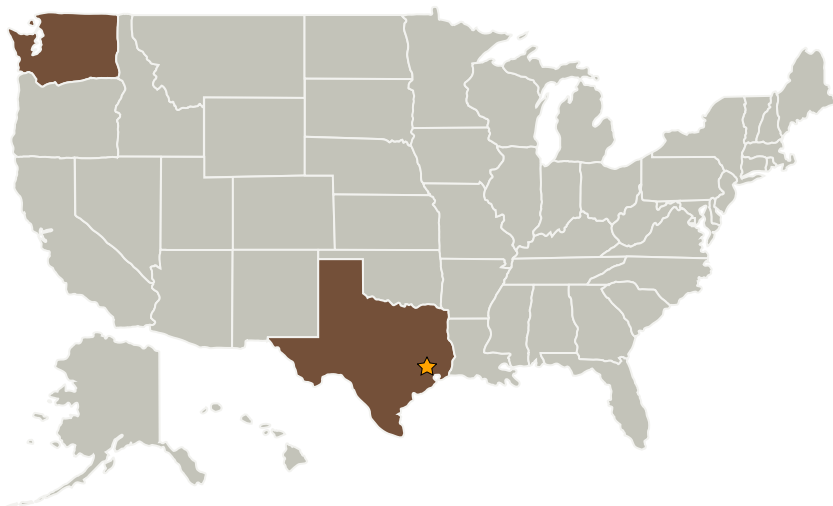
Completed Technology Project (2008 - 2008)



Project Introduction

We propose to build a monolithically integrated FPA of densely packed APDs (70-um pitch) operating at or around 1500 nm wavelength that is suitable for the solicited autonomous precision landing and hazard detection and avoidance system. These would be capable of 3D imaging an area of 150m x 150m from a distance of 1 -- 2km. By using highly efficient detector material (InGaAs/InP) a number of significant advantages can be leveraged. These include compactness, low mass, low cost and most importantly low power consumption and low thermal dissipation which are of primary concern in a remote environment such as the un-manned Lunar or Mars landing vehicles. It is expected that each pixel will have modest speeds (1 nano-second response time), high gain (>30) and ultra low-noise ($k < 0.2$) and that the FPA is easily manufactured using established growth, fabrication and packaging technologies. These FPAs would be bump-bondable to an appropriate Read Out Integrated Circuit (ROIC) that can reliably sustain a frame fresh rate of at least 20Hz and be capable of resolving depths of a few centimeters.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
nLight Photonics Corporation	Supporting Organization	Industry	Vancouver, Washington



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Texas

Washington

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Shabbir Bashar

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes